

## CLAIMS

1           1. Apparatus for sensing spark in an igniter in a gas turbine  
2 engine, comprising:

- 3           a) a holder into which the igniter is inserted;  
4           b) a coil mounted in the holder; and  
5           b) a detector for detecting current in the coil.

1           2. Apparatus according to claim 33, wherein said holder  
2 reaches a temperature of 175 F or greater during normal operation  
3 of the engine.

1           3. Apparatus according to claim 1, wherein the coil is in  
2 thermal contact with the igniter.

1           4. Apparatus according to claim 1, wherein said holder is  
2 conductive and held at a system ground.

1           5. Apparatus according to claim 2, wherein no electrical  
2 current passing through the igniter enters the coil.

1           6. Apparatus according to claim 1, wherein (1) a cable runs  
2 from an exciter to the igniter, (2) the cable delivers electrical  
3 power to the igniter, (3) an external conductive shield surrounds  
4 the cable and is connected to the engine, and (4) the cable  
5 connects to the igniter at a contact point, and a second conductive

6 shield extends from the contact point along the igniter, and  
7 wherein

8 d) the coil is wholly external to both conductive  
9 shields.

1 7. Apparatus according to claim 1, wherein part of the  
2 igniter forms a core of the coil.

1 8. Apparatus according to claim 6, wherein the second  
2 conductive shield comprises a housing of the igniter.

1 9. Apparatus for attaching an igniter to a gas turbine  
2 engine, comprising:

3 a) a base containing a threaded bore, into which bore  
4 the igniter can be threaded;

5 b) holes in the base through which fasteners can fasten  
6 the base to the engine; and

7 c) a coil affixed to the base, for detecting currents  
8 in the igniter.

1 10. Apparatus for attachment to an igniter for a gas turbine  
2 engine, the igniter having (1) a proximal end, (2) a casing at the  
3 proximal end, the casing having a cross sectional shape S, and (3)  
4 an electrical connector at the proximal end, the apparatus  
5 comprising:

6 a) a housing having an internal aperture matching shape

7           S, so that the housing fits about the proximal end;  
8           b) within the housing,  
9                i) an inductive pick-up, and  
10               ii) an amplifier which amplifies signals  
11               produced by the pick-up.

1           11. Apparatus according to claim 10, wherein the inductive  
2           pick-up is in thermal contact with the casing, when the housing is  
3           fitted about the proximal end.

1           12. Apparatus according to claim 10, wherein the amplifier  
2           comprises an RLC amplifying circuit.

1           13. Apparatus according to claim 12, wherein the igniter is  
2           powered by non-sinusoidal voltage pulses of frequency  $F$ , with each  
3           pulse having a duration  $D$ , and the RLC resonant circuit is resonant  
4           to sinusoidal steady-state excitation of a frequency  $1/2D$ .

1           14. Apparatus according to claim 13, wherein the non-  
2           sinusoidal voltage pulses are substantially triangular.

1           15. Apparatus according to claim 13, and further comprising  
2           a ring of high permeability material which surrounds the igniter  
3           when the housing is fitted to the igniter, and a magnetic field  
4           produced by current passing through the connector travels through  
5           both the high permeability material and the inductive pick-up.

1        16. Apparatus, comprising:  
2        a) an igniter for a gas turbine engine;  
3        b) an inductive pick-up adjacent the igniter; and  
4        c) an amplifier having no active elements, which  
5        amplifies signals produced by the pick-up.

1        17. Apparatus according to claim 16, wherein the pick-up  
2        produces signals when the igniter produces sparks.

1        18. Apparatus according to claim 16, wherein the amplifier  
2        comprises an RLC resonant circuit.

1        19. Apparatus according to claim 18, wherein the igniter is  
2        powered by non-sinusoidal voltage pulses of frequency  $F$ , with each  
3        pulse having a duration  $D$ , and the RLC resonant circuit is resonant  
4        to sinusoidal steady-state excitation of a frequency  $1/2D$ .

1        20. Apparatus according to claim 16, wherein the amplifier  
2        contains no active elements.